EVOLUTION OF NETWORK AND SERVICE MANAGEMENT

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Comarch: why are we here

• Founded in 1993 as a university spin-off

• 1999 – Comarch goes public - IPO at the Warsaw Stock Exchange

• Software house selling licences as a service in several industry verticals

• 4500 employees in 40 countries

• 250 million Euro turnover with 80% of added value

• 2013 growth of 8% (600 new jobs created in 2013)
OSS STORY
THE EVOLUTION

Every five, seven years new communication technology appears, new business models come to the telecommunications and the software industry.

- During the last **twenty years** Comarch has developed products encompassing those changes enabling new business models.
- Today, the challenge is an integration of the telecommunication world and IT world into a **telecom cloud** – a pillar of the new digital ecosystems.
OSS STORY: Comarch comes into being in the postcommunist Poland

1993 - 1999

- Booming IT, Major Investments in Telecom Networks, Digital switches
- Deregulation of the Telecommunication Industry in Poland

- Building telecom software from scratch
  - Fault Management System for IT
  - Network Inventory Management System for Telcos

- Expertise in SDH/WDM National Backbone Network Modelling and Management

SEZTEL
The biggest distributed data base system in Poland
OSS STORY: International cooperation

1993 - 1999

- Booming IT, Major Investments in Telecom Networks, Digital switches
- Deregulation of the Telecommunication Industry in Poland

- Comarch Laboratory:
  - Building software based on telco platforms (like TeMIP)
  - Software design & development for Lucent and DSC
  - Cooperation with NEC, Alcatel, GPT

- Investment in the latest IT technology: C++, ORACLE (PL/SQL, forms, CASE), later also JAVA, CORBA;
- Cooperation with market leaders: IBM, HP, ICL, DEC and challengers (SUN, Oracle)
OSS STORY: Product development

2000 - 2003
• Mobile Access, Mobile Networks, VoIP, Featurephones

• Comarch Products (Commercial off-the-shelf – COTS)
  – Network Assurance (FM, PM) System for Telcos
  – Network Inventory Management System for Telcos
  – Umbrella approach based on FCAPS, eTOM, TAM, OSS/J, MTOSI

• Comarch Laboratory
  – Marconi, Alcatel, Ericsson, NOKIA equipment
  – Partnering and development for NOKIA

• Very strong competition in OSS/BSS and new technologies (Mobile, IP) resulted in global opportunities and high demand for new software product like Comarch OSS
• At that time the decision to maintain the strategy of developing our own products was not so obvious but we decided to follow that way
OSS STORY: Comarch: the European challenger

2004 - 2008
• Mobile Broadband, 3G, NGN, Convergence,
• Market saturation brings service orientation in Network Management

Service Inventory Management System for Global Telcos
• Common, multinational services for global companies

True Multi-vendor Network Management System
• Service Assurance (FM, SM, PM, SLAM)
• E2E Connectivity
• E2E Configuration Management

Difficult questions for the future:
• Process-driven operations?
• Telco operations outsourcing?
• Offshoring R&D?
OSS STORY: Comarch becomes a partner of Tier 1 operators

2009 - 2013

- NGN/All IP, 4G, FTTx, Convergent Transport, New Services M2M/Cloud, SOA/REST interfaces, Open APIs, Cloud Computing
- Automation and simplification - looking for process optimization and cost savings

Best of breed NG OSS Suite:
- NG Service Assurance (FM, SM, PM, SQM, CEM)
- NG Service Fulfillment
- NG Network Planning
- PDI (Process Driven Inventory)

OSS Business Services (Transformations, Managed Services, End 2 End responsibility)

Big Transformation Projects, New Players and Challengers in OSS domain (Equipment Vendors and Global Services Vendors)

Comarch becomes a strategic partner for Tier 1 operators
Today, innovation and flexibility place Comarch OSS as a challenger among Top OSS Providers (Gartner MQ, 2013)

Figure 1. Magic Quadrant for Operations Support Systems

Comarch OSS products are highly configurable and characterized by ample and out-of-the-box functionality, yet allow easy customization according to customer needs and interoperability with assurance and fulfillment legacy systems. The three-layer application architecture (based on the Model-View-Controller software architecture pattern) enables flexible and easy system data model changes and configuration, without requiring new custom developments ...

Comarch has a strong product road map and vision that address key CSP initiatives to grow revenue, improve operational efficiency and customer experience ...

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OSS STORY: The future

2013 +

- Digital Services, Cooperation with Over the Top players (OTTs)
- Software Defined Networking (SDN), Network Function Virtualization (NFV)

- 4G Rollout and Use
- Policy based Quality
- End 2 End Customer Experience
- Simplification and Automation
- Virtualization and openness

- End-to-End Inventory Planning and Optimization (RAN/Fixed Access/Transport/Core)
- Service Assurance and Quality Management
- Customer Experience Management (customer centric OSS)
- Catalogue Driven Fulfillment and Charging (click and buy)
- Runtime OSS driven by Customer Policy, supporting SDN/NFV Virtualization and Umbrella SON function
- Real time decision support and forecasting (big data in OSS)

OSS migration from back-office systems towards OSS runtime systems, Enabling NFV
Controlling and Orchestration for future telecom clouds
EVOLVE WITH COMARCH
EXAMPLES OF TRANSFORMATION PROJECTS
Evolution from network planning tool to planning and inventory automation

- **Convergence in Resource Inventory Management**: full scope of radio, fixed access, transmission and core

- **Complete network/service lifecycle management**

- **Optimization** built into the solution (Processes, SON support)

- **Closing the loop** between Planning, Assurance, Fulfillment and Customer Experience (Network and Business Intelligence)

- **Dynamic Capacity Management** supported with network topology updates and optimization algorithms

- **Unified Support for future Virtualized and Non-Virtualized Infrastructure**
Standarization

40 applications
120 interfaces

7 applications
less than 20 interfaces

Simplification & Automation

110 processes

65 processes with
800 automatic steps
Evolution from legacy, reactive Fault Management to Runtime Service Monitoring and Service Assurance
Evolution from legacy, reactive Fault Management To Runtime Service Monitoring and Service Assurance

OSS is a source of consistent information about network topology and services

OSS monitoring runs in near-realtime mode

Root cause analysis and Customer Impact calculated. Customer notified or problem solved automatically

1st alarm received

List of correlated alarms ready to use

NEW proactive, on-line

OLD reactive, back-office

ABOUT 26
Evolution from Service Provisioning to Catalogue driven Fulfillment & Order to Cash automation
Implementation for T1 customer in Europe (B2B Transformation)

- Solution had been verified and measured against legacy systems

Major improvements when compared to legacy setup
- +85% for Business Internet order & delivery
- +90% for Payment Terminal order & delivery

Significant savings on human work
- Largely improved automation in order capturing
- Huge automation improvements in order delivery

Significant savings on time to order
- In legacy not possible to handle order with customer on phone (process taking around an hour)
- In new system handled with customer on phone with ease
THE NEXT STEP

EVOLUTION FROM HARDWARE CONFINED TELECOMMUNICATIONS TO ELASTIC SOFTWARE BASED NETWORKS, CLOUD AND DIGITAL ECOSYSTEMS
Network Function Virtualization (NFV) and Orchestration of Network, Computing and Storage resources

• **Virtual IT (computing, storage)** - commodity
  – Virtualized IT (IaaS, PaaS) – VMWare, vCloud, Amazon EC2, OpenStack, ...
  – Cloud Applications, Connected Apps and Devices - AppMarkets
  – Content Delivery Networks – Akamai, Maxcdn, Amazon CloudFront, ...

• **Software Defined Networking (SDN)** in routing control and mediation, SDN Control Function – OpenFlow v 1.3 (supported by openflow.org)

• **Network Function Virtualization (NFV)** for better optimization of infrastructure and computing resources through reallocation of virtual function and dynamic allocation of computing resources within the entire network (supported by ETSI.org)
  – **Virtual(ized) Network Infrastructure** - Open Daylight over OpenFlow and OpenStack (linux.org)
  – **Virtual(ized) Network Functions** – e.g. virtual S-GW/PDN-GW, virtualized CDN
  – **NFV Orchestration and Virtual Network Function Management** – New OSS
SND/NFV – business impact: EXPECTATIONS

Better optimization of the infrastructure and computing resources through reallocation of virtual network functions and dynamic allocation of computing resources in the network

✓ Standard, simplified hardware (switches), Lower CapEx
✓ Lower OSS OpEx (no vendor specific mediators, adapters, APIs)
✓ Easier configuration, operations and maintenance
✓ High flexibility – software-based (API) not configuration-based
✓ Centralized computing – reduced power consumption while switching nodes
✓ More efficient testing of new applications – improved TTM for new services
✓ Lower risk of faults and theft of IPR
✓ Easier 4G network monetization
✓ Opening a new market to software suppliers and innovative services

... moving competition from hardware layer to software layer to boost innovation
COMARCH SDN/NFV PROGRAM
Comarch SDN/NFV Program (1) - SDN

Using Comarch OSS capabilities in the SDN Controller Layer

Comarch solutions can be used by the Controller Layer to get the E2E view of the network for “smart decisions”

- “push” -> “pull”, dynamic, “run time” access to BSS/OSS by SDN controller
  - Network Inventory – for an end-to-end view of the network with a complete topology
  - Service Inventory – to provide insight into the customer service view of the network, thus letting the controller make customer-centric decisions
  - Service Fulfillment – to translate customer orders for e.g. VPN/M2M-specific business services into orders for virtual networks
  - Service Assurance with SQM and CEM – to enable the SDN controller to pro-actively reshape the network and provide good quality of service, and even implement a SON self-healing function
  - Network Planning – to plan the physical infrastructure in accordance with the virtual network’s needs in a cost-effective way
SDN – Using runtime functions of BSS/OSS

Getting E2E view of the network for “smart decisions”
SDN and Runtime OSS on ETSI NFV reference architecture
Comarch SDN/NFV Program (2) – NFV

Using capabilities of Comarch OSS (PaaS) in NFV Management and Orchestration

• OSS „traditional” role:
  – **Orchestration of EMS in transparent way** no matter if NF is exposed by virtual EMS or non-virtual (VNF or PNF) EMS

• New Real-time OSS – part of NVF:
  – **Managing of new virtualized entities** with configuration, monitoring, fulfillment and complete life cycle management - Insight into physical and logical nodes
  – **Consistent Monitoring** of Performance
  – **Colocation of NFV** with applications
  – **OSS to assist in dynamic decision** thanks to end-to-end view of the network, and service and policy management
Comarch OSS in the SDN and NFV context
References (SON/SDN) – Comarch publications and reference architectures

- **Software Defined Networking – how BSS/OSS tools can help unleash innovation**

- **Employing the Self-Organizing Network concept for LTE rollout**

- **Towards Self-Organizing Networks**

- **NFV + SDN – network in the cloud or cloud in the network?**

- **Customer Experience-centric Network Planning & Optimization**

- **Comarch Technology Review: Issue 2/2013**
  - The Exciting world of Digital Services - a new accelerator for telecoms
  - How to differentiate your M2M offering to ensure a competitive edge
  - Do EU regulations support or hinder digital service adoption in Europe?
  - Software Defined Network - how BSS/OSS tools can help unleash innovation

- October 22-24, 2012 at the “**SDN and OpenFlow World Congress**”, Darmstadt-Germany. This white paper is available at the following link: [http://portal.etsi.org/NFV/NFV_White_Paper.pdf](http://portal.etsi.org/NFV/NFV_White_Paper.pdf)

- **„Network function Virtualization Use cases”** ETSI GS NFV 001 v 1.1.1, (2013.10)
Thank You